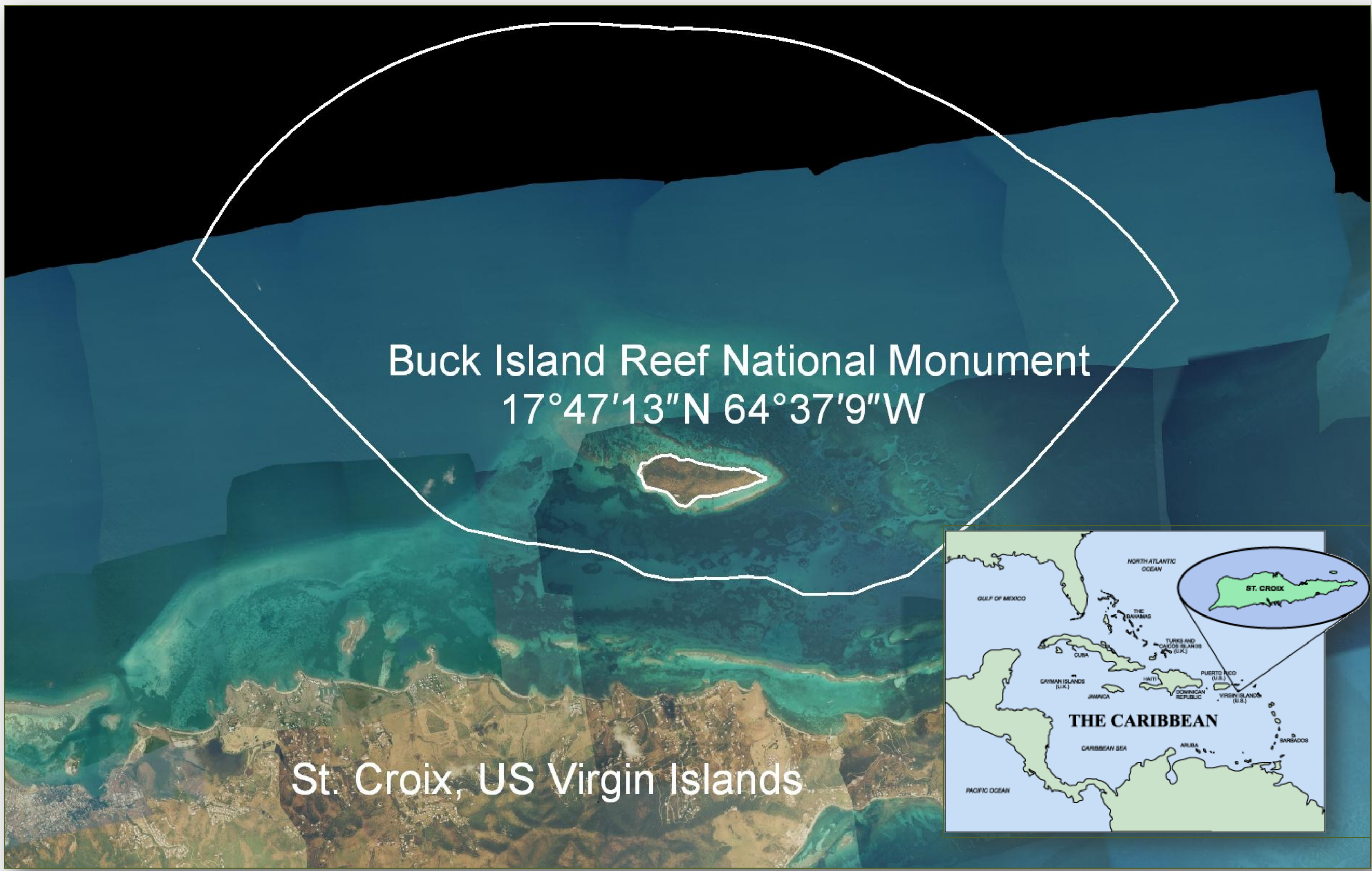


# Buck Island Sea Turtle Research Project 1988-2009: nesting beach trends, research, and management actions

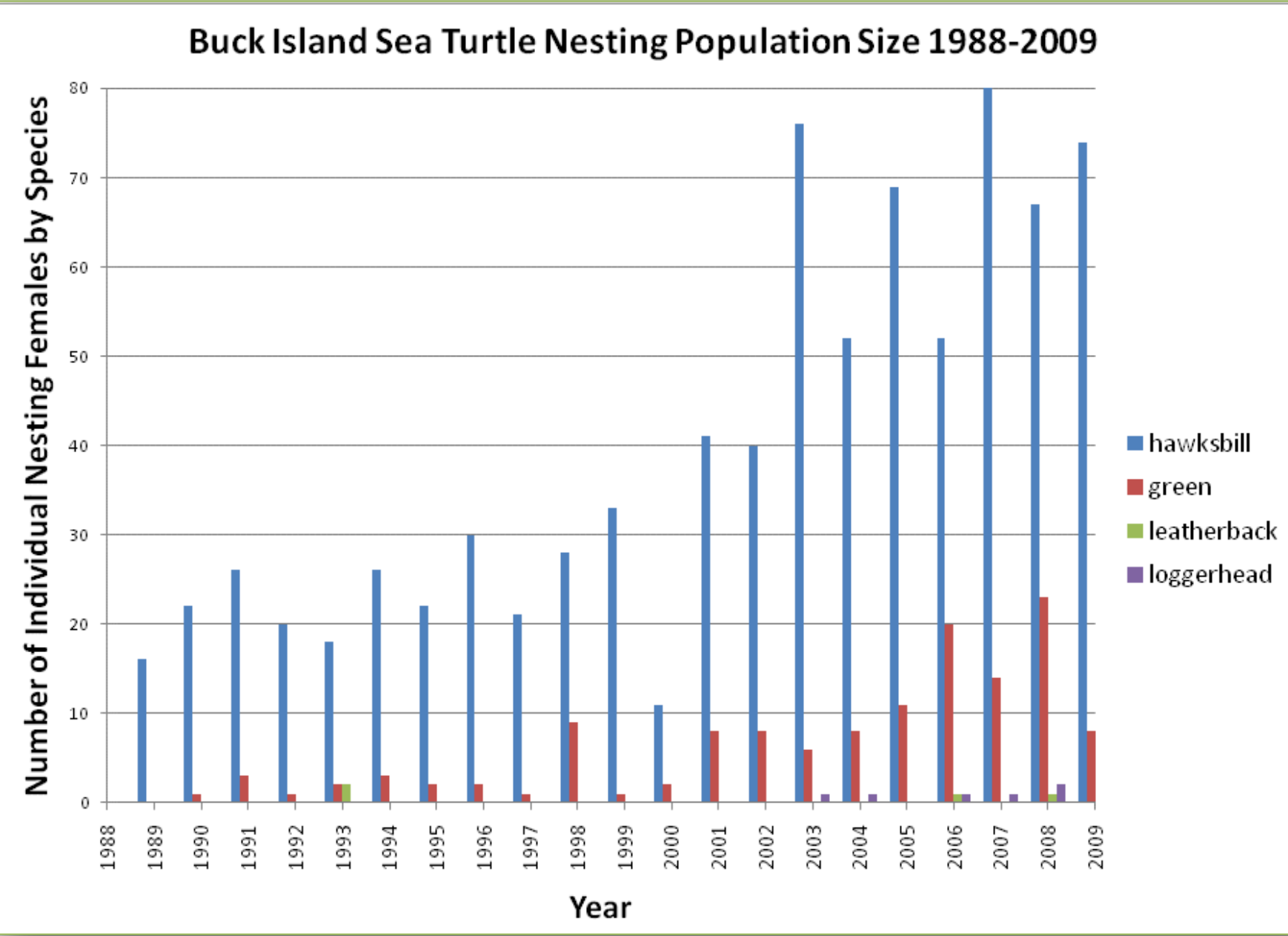
National Park Service  
U.S. Department of the Interior



Buck Island is an important nesting area for hawksbill sea turtles in the USA (Meylan1999) and an index beach for the recovery of hawksbills in the Eastern Caribbean (NMFS 1993). For over 20 years National Park Service has managed the **Buck Island Sea Turtle Research Program** conducting a saturation tagging project for four species of listed sea turtles: hawksbill (*E. imbricata*), green (*C. mydas*), loggerhead (*C. caretta*), and leatherback (*D. coriacea*). The standardized protocol for the nesting beach program is available at <http://cars.er.usgs.gov/Seaturtles.pdf> In the course of 30 years NPS has undertaken management actions we believe to have improve sea turtle success within the park boundaries and contributed to projects furthering sea turtle conservation in the Caribbean.

## Nesting Populations on the Rise!

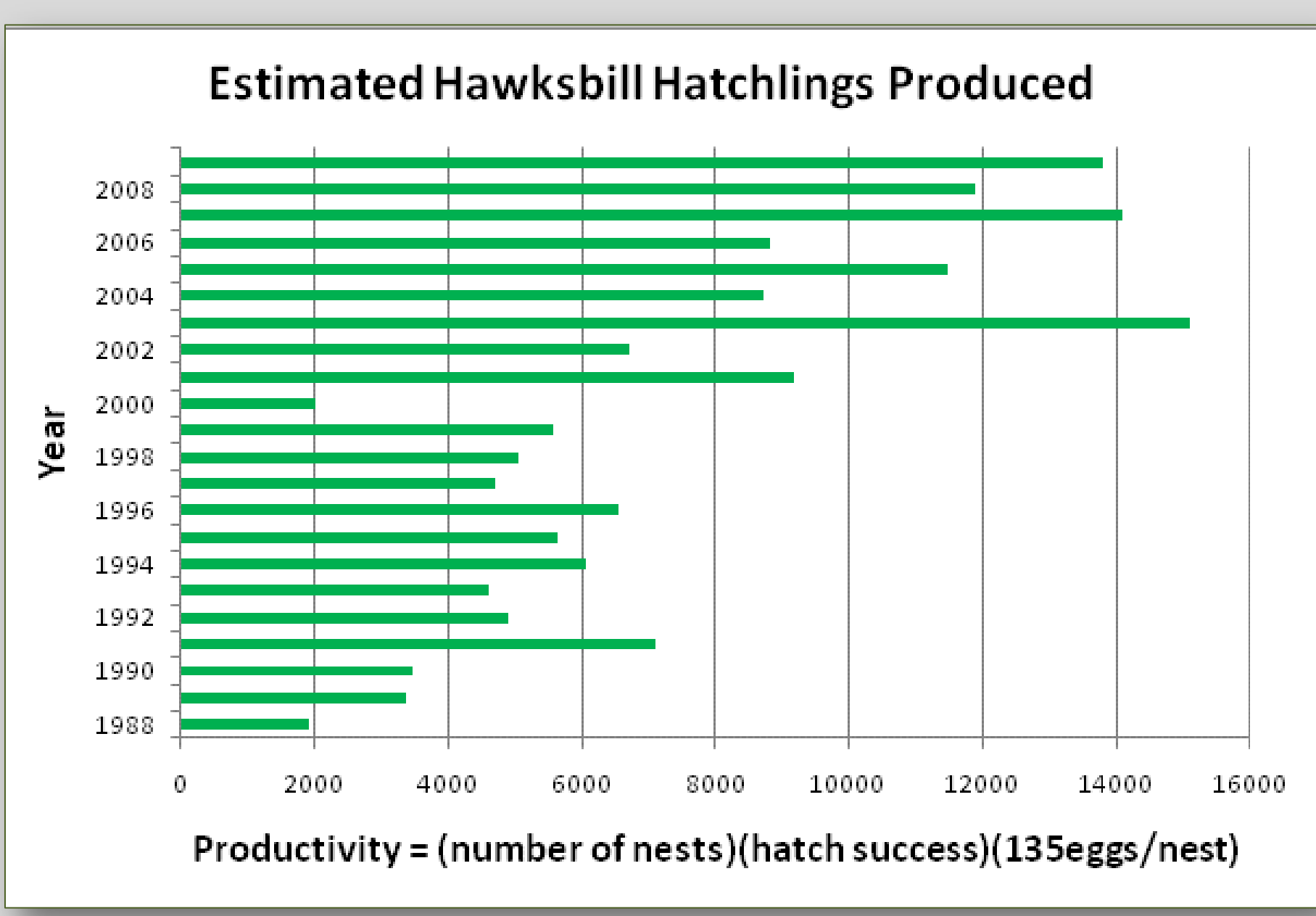
Over the last 10 years the 400 percent increase in nesting population size has become the driving force for change in the research and management of sea turtles at Buck Island Reef NM.



We believe the resulting nesting population increase is a combination of both local effects and the increased regional sea turtle cooperation over the last 20 years. Because Buck Island is part of National Monument many threats to sea turtle populations are inherently abated. All federal laws are enforced (e.g. the Endangered Species Act), and there is no-take of any resources within the Monument since 2001 (Fed Reg. Vol. 66, No. 14) The island is not contiguous with inhabited areas and closed to the public from sunset to sunrise allowing NPS to implement and enforce management actions island-wide. Any potential conflicts between visitor activities and sea turtles are adverted through education efforts.

At the beach, enforcement rangers stopped turtle hunting and poaching of eggs in the 1970s, and improved protection for nesting turtles continued with presence of research staff beginning in 1987(BISTRP, 2002). Over the past four decades non-native predators, mongoose and tree rats the former principle predators of sea turtle eggs and hatchlings, have been eradicated from the island (Witmer, 2007), and exotic invasive plants have been removed in favor of natives. In 1999, Wibbels et al, found hatchling s had a female bias. As the beach forest continues to recover from Hurricane Hugo, 1989, NPS continues to monitor hatchling sex to better understand issues related to temperature sex determination.

## Beach Productivity going up!



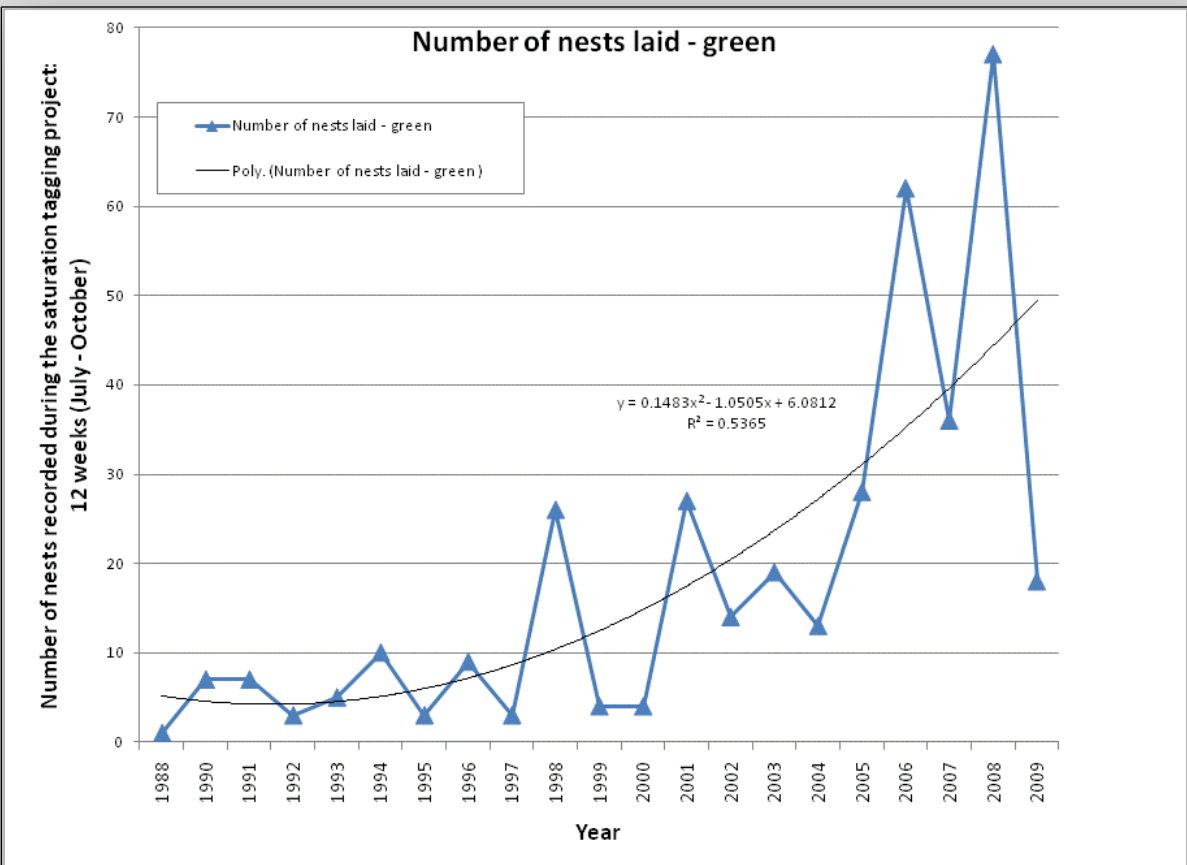
Increased numbers of nesting hawksbill turtles combined with nesting beach management actions has dramatically increased number of hatchlings leaving Buck Island beaches seasonally.

## What's New on the Beach? loggerheads, greens, hawksbill survivorship

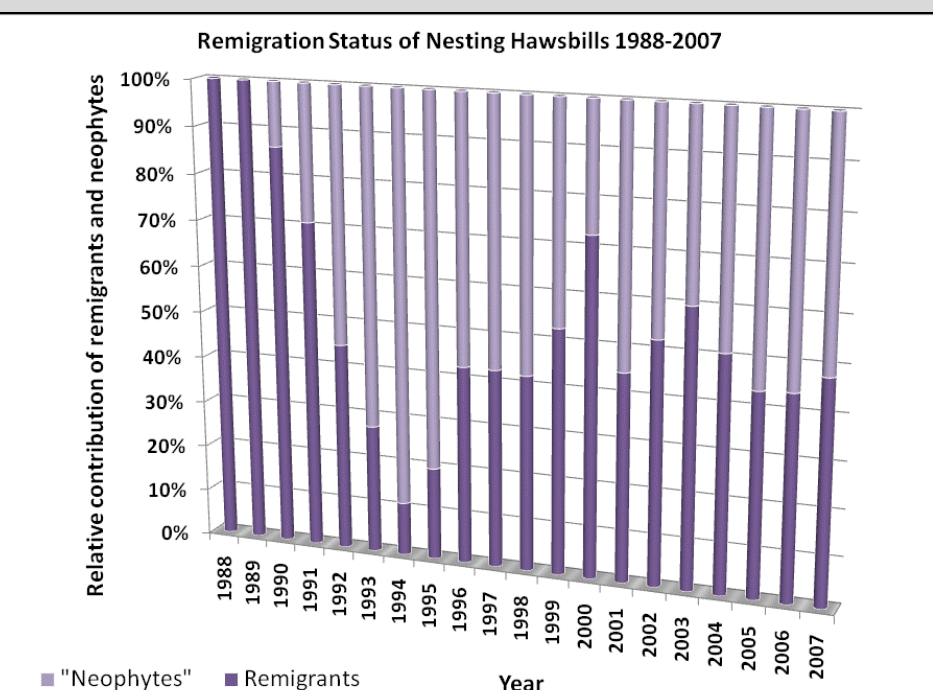


Extremely rare in the Virgin Islands *Caretta caretta* have been documented nesting at Buck Island since July of 2003 (Pollock, 2009). Two nesting females have established Buck Island as their nesting beach for past seven years raising questions about regional population dynamics with habitat loss, global climate change and other anthropogenic pressures that might contribute to *C. caretta* emigration to possible historic nesting beaches in the Caribbean. Alternatively, we suspected that these *C. caretta* individuals might be hybridized therefore exhibiting behaviors associated with more tropical sea turtle species such as hawksbill; however microsatellite genotyping has been completed for one female, and no sign of hawksbill introgression was detected (Nairn, NPS IAR, 2009). We anticipate collecting a successful tissue sample from the second female this nesting season for further analysis .

*C. mydas* have been present in the Buck Island nesting population since 1990, but at low numbers. In 2005 new recruits to the population were detected. We are working with Brian Shamblin, UGA, to assess their relatedness and determine their source population which maybe a distinct management unit closely associated with Aves Island (Nairn, 2009).



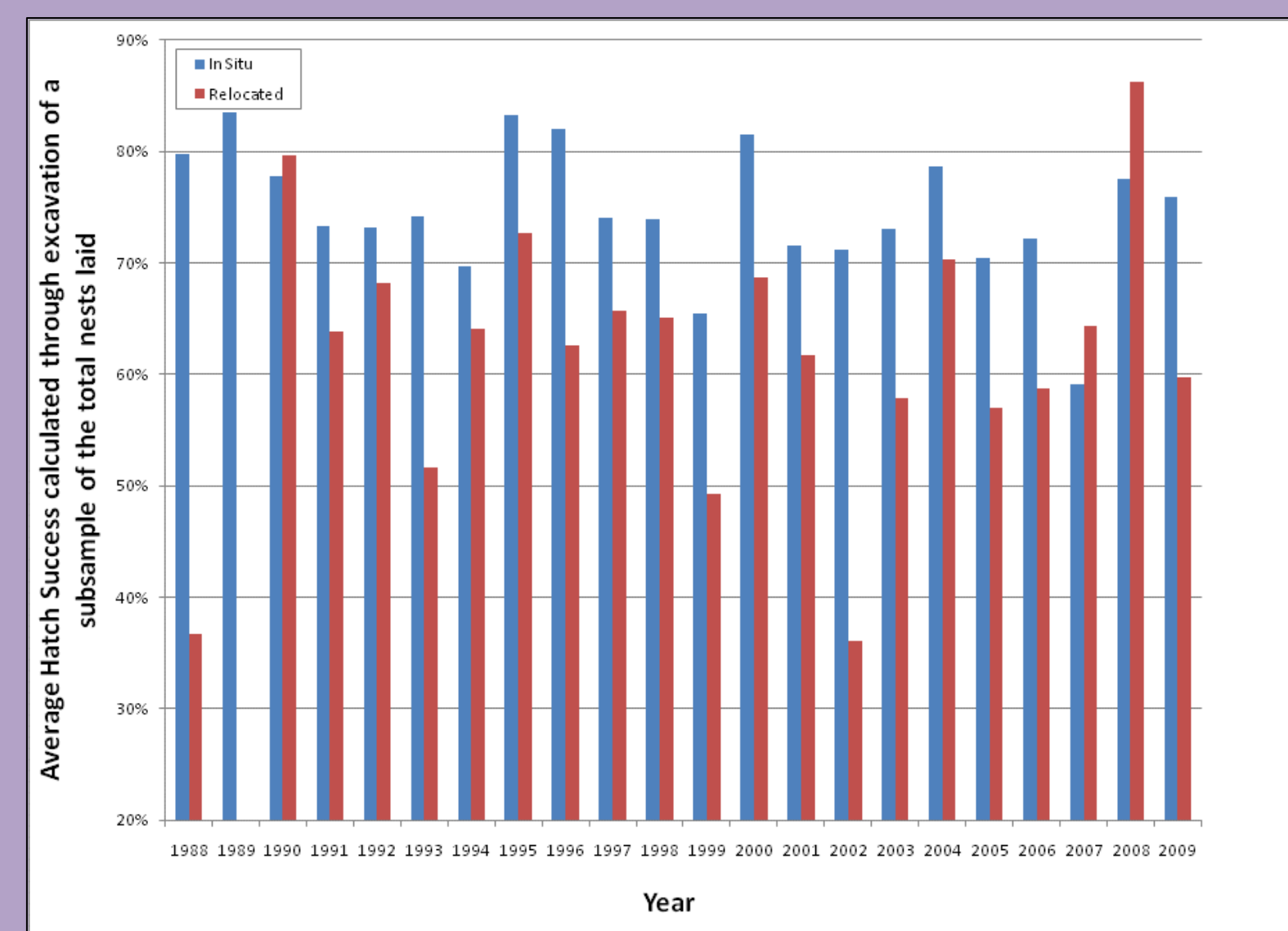
Conflicts have arisen between green and hawksbills where they share the limited shoreline nesting habitat resulting in increased interspecies nest destruction.



## Neophytes vs. Remigrants

24 years ago all hawksbill turtles on the beach were neophytes. Ten years later all adults in the population were tagged. Beginning in 2001, through a steady contribution of new turtles to the Buck Island population, an equilibrium had been reached resulting in growing hawksbill population. we have today.

## Dealing with Space: greens digging up previously laid clutches

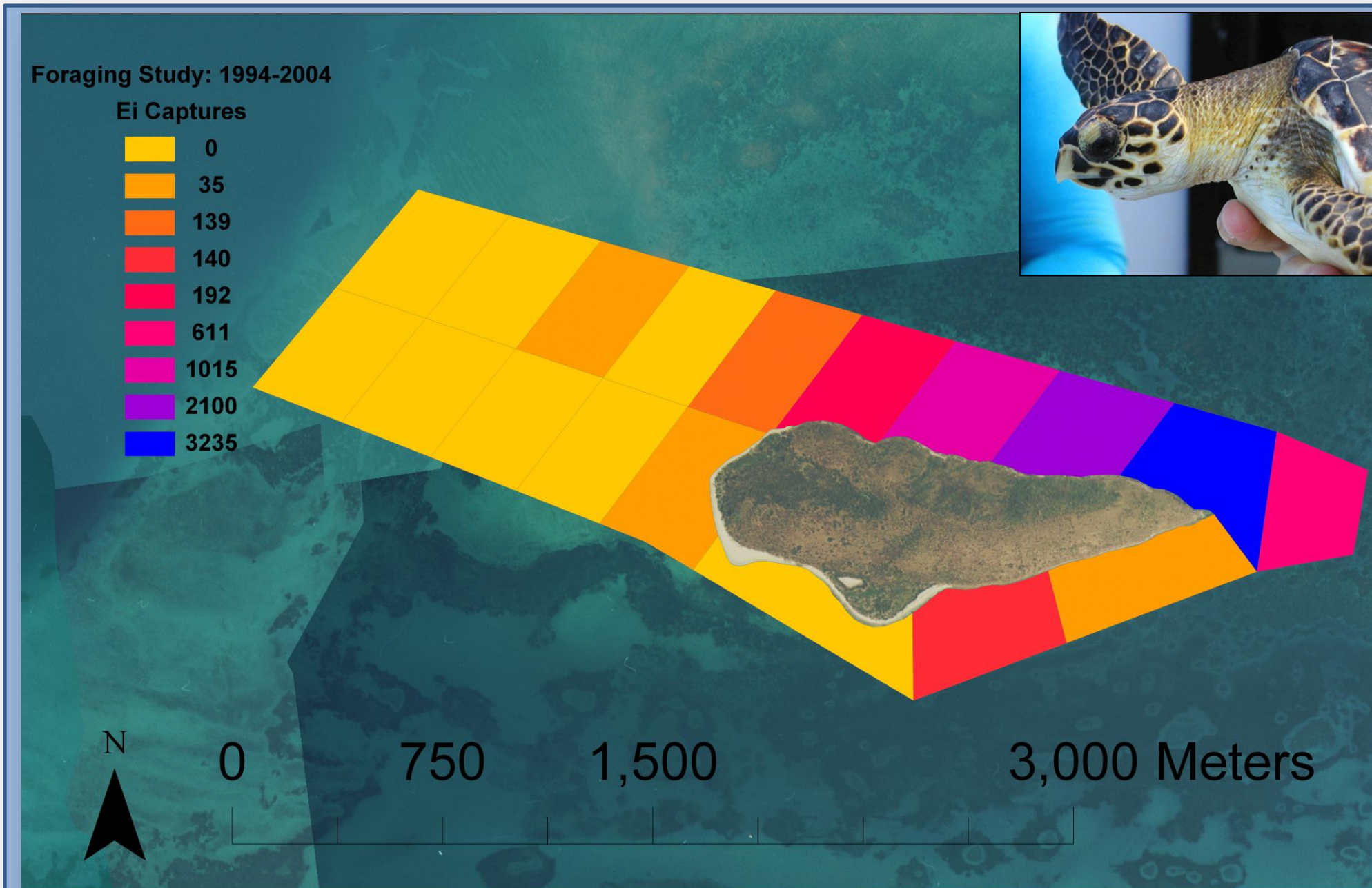


Approximately 20% of nests laid are relocated. from sections of the beach which normally experience high levels of intra-season sand transport from locations that are vulnerable to erosion from isolated storm events (i.e. hurricanes), from low-lying locations where inundation is possible, and from high traffic areas (i.e. underneath picnic tables). Typically clutches are relocated to the closest location safe from these factors. Anecdotally open beach habitat at BIRNM has decreased; it is suspected that overfishing of parrotfish, the increasing frequency of storm events and sea level rise are contributing factors.



In 2009, Lundgren conducted graduate research to measure preferential habitat characteristics and substrate type to maximize hatch success. Determining when to relocate nests involves refining thresholds such as how far from the high water mark is acceptable along different portions of beach, and understanding storm seasonality. Finding optimal conditions to relocate eggs to requires insight into habitat and substrate effects (Lundgren, 2009).

## Habitat Use: foraging residents and inter-nesting adults



**Developmental Habitat/Foraging Population History:** From 1994-2004 the NPS conducted an assessment of the foraging hawksbill population at BIRNM. Over 7000 turtles were encountered. There was one adult green tagged and captured 35 times and 280 sightings of unidentified juvenile greens. There were 52 hawksbills tagged (three adults , 6 sub-adults, and 43 juveniles), these animals were captured often. Hawksbills were concentrated in the north and east sectors of the Monument . These data were augmented and corroborated by directed research projects by Roy Pemberton and Sandra Storch. (REFs). In 2001, President Clinton expanded the Monument boundaries from 880 acres to 19,000 acres (see expanded boundary in the upper left). With the expanded area and increase in nesting populations, there is good reason to re-evaluate habitat use at BIRNM, and to expand the species of interest to greens and hawksbills.

In 1998 Storch retrieved 3 TDR units after 2nd and 3 nesting seasons providing insight into wild adult hawksbill female behavior at their foraging grounds. Tracked the first ever hawksbill hurricane event!

1998-1999 Pemberton found that juvenile hawksbills turtles at Buck Island have relatively small home range in reef areas with zooanthids, and strong site fidelity.

In 2011, NPS and USGS Research Ecologist, Kristen Hart, initiated a three-year study of sea turtle habitat use (inter-nesting and foraging), migration pathways, and a re-evaluation of foraging population structure. This work will use the established nesting beach project to deploy satellite and acoustic transmitters in addition to in-water captures.

The study design is based on previous work conducted by Hart at Dry Tortugas and Everglades National Parks, and the 1994-2004 foraging study at Buck Island Reef National Monument (BISTRP, 2002)



## Acknowledgements

Buck Island Reef NM will celebrate its 50<sup>th</sup> Anniversary December 2011. This season will be BISTRP 24<sup>th</sup> year of research and monitoring made possible through on-going support of the National Park Service, our partner The Buccaneer Hotel, and the hundreds of dedicated sea turtle biologists, volunteers, our family and friends.

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